



NDM Modelling Error

An Industry Guide

Updated October 2023

Glossary of Terms

- Non-Daily Metered (NDM) – of the c.25m Gas Supply Meter Points the majority are Non-Daily Metered
- Daily Metered (DM) – Supply Meter Points that are read Daily - usually very high consumption
- Annual Quantity (AQ) – An estimate of the amount of gas (in kWh) that a Supply Meter Point will use in the coming year under seasonal normal weather conditions
- End User Category (EUC) – Categorise gas consumers by their different usage patterns. Each NDM supply point belongs to an EUC.
 - For Lower consumption Bands (0 to 293 MWh pa) this includes separate EUCs for Domestic and Non-Domestic and Pre-Payment and Non-Prepayment meters
 - Higher Consumption Bands (>293 MWh pa) are grouped into 4 separate EUCs based on their Winter/Annual Consumption Ratio (WAR) which provides an indication of the consumption seasonality
- Local Distribution Zone (LDZ) - Each LDZ represents a geographical area of the country. Each LDZ is 'owned' by a specific gas transporter and determine the area for which they distribute gas. Here is a helpful [LDZ Map](#).

What is NDM Modelling Error?

- NDM Modelling Error is the difference between the Estimated view of Demand at D+5 and the Actual Demand for the NDM population (c.25m)
- The estimate of **NDM Supply Meter Point Demand** is derived by the **NDM Algorithm** which relies on Gas Demand Profiles built from underlying Demand Models for each End User Category (EUC)
- NDM Modelling Error causes 'Temporary UIG' at D+5 until Meter Point Reconciliation occurs in the NDM population. At this point the differences become known and the error is removed from UIG

LDZ Demand Attribution:

$$\text{LDZ Measured} - \text{DM Measured} - \text{NDM Estimated} - \text{Shrinkage Estimated} = \text{UIG Remaining}$$

NDM Estimated Supply Meter Point Demand:

$$\text{EUC Level} * \frac{\text{AQ}}{365} * \text{ALP}_t * (1 + (\text{WCF}_t * \text{DAF}_t))$$

What are the causes of NDM Modelling Error?

NDM Estimated Supply
Meter Point Demand:

EUC Level

$\frac{AQ}{365}$

*

ALP_t

*

$1 + (WCF_t * DAF_t)$

- EUC Demand Models aim to represent the NDM Population consumption behaviour as accurately as possible, however, as with any model, imperfections will exist which cause Modelling Error
- These imperfections can be caused at various points within the NDM Algorithm, considered below:

EUC Level

The End User Category (EUC) is the means for splitting up the various consumer types within the NDM population. Inaccuracy of Supply Point data in UK Link e.g. Market Sector Code, can contribute towards causing modelling error – e.g. inappropriate EUC assignment and/or use in demand model production

$\frac{AQ}{365}$

The Annual Quantity (AQ) provides a view of typical annual consumption assuming seasonal normal conditions. Inaccuracy in the AQ in UK Link due to, for example, out of date meter readings, can contribute towards causing modelling error – e.g. inappropriate EUC assignment and/or leading to an estimate which doesn't reflect latest consumption levels

ALP_t

The Annual Load Profile (ALP) provides a 'baseline' estimate of the seasonal normal demand for a particular day in the gas year. The ALP takes into account gas consumption characteristics such as day of the week, time of year, holidays and seasonal normal weather. All these features, although modelled, will not work perfectly and so can contribute towards modelling error

$1 + (WCF_t * DAF_t)$

The Weather Correction Factor (WCF) and Daily Adjustment Factor (DAF) adjust the seasonal normal demand to reflect the observed weather conditions on the day. The DAF reflects an EUC's weather sensitivity based on historical consumption, however, although modelled, will not work perfectly in combination with the ALP and so this final part of the NDM Algorithm can also contribute towards modelling error

How is NDM Modelling Error measured?

- The industry as a whole clearly has a role to play in maintaining Supply Point data on UK Link and ensuring meter reads are up to date to support accurate AQs and EUC assignment, however the main demand modelling obligations reside with Demand Estimation Sub Committee (DESC)
- As the custodian of the process for (i) deriving End User Categories, (ii) Gas Demand Profiles (ALP,DAF) and (iii) maintaining the relationships between weather and demand through the Composite Weather Variable (CWV), it is important that DESC reviews the accuracy of the EUC demand modelling process
- Each December, DESC completes a review of the 'NDM Algorithm performance' for the previous Gas Year. This analysis currently considers three 'Strands': 1) Weather 2) UIG and 3) Modelling Error
- 'Strand 3 Modelling Error' is calculated by comparing daily actual consumption from a sample of consumers for each EUC and comparing this to the demand allocated via the NDM Algorithm, which can provide an indicator of the modelling error at population level

**NDM Estimated Supply
Meter Point Demand:**

EUC Level

$\frac{AQ}{365}$

*

ALP_t

*

$1 + WCF_t * DAF_t$

- However, the Strand 3 analysis attempts to only consider the imperfections caused by ALP, DAF and WCF values. Modelling Error caused by out of date AQs is 'out of DESC's hands'.
- This analysis can be flawed if the supply point data is incorrect, leading to inappropriate conclusions. The EUC part of the NDM Algorithm is also partly considered when, for example reviewing the success (or not) of new EUCs

What are the latest NDM Modelling Error Figures?

- In December 2022, DESC Considered the latest analysis for Gas Year 2021/22
- Full results are available in the secure document area of UK Link [here](#).
 - Folder path 18. NDM Profiling and Capacity Estimation Algorithms \ 2023-24 Gas Year \ 4 NDM Algorithms booklet \ Section 12_23, Strand 3 specifically covered with NDM Algorithm Performance
 - If you require access, it can be requested [here](#)
- For a summary, the DESC presentation is available [here](#)
 - a further update was provided [here](#)
- The domestic results, shown on the right, reflect the reduced consumption as a result of rising energy prices.



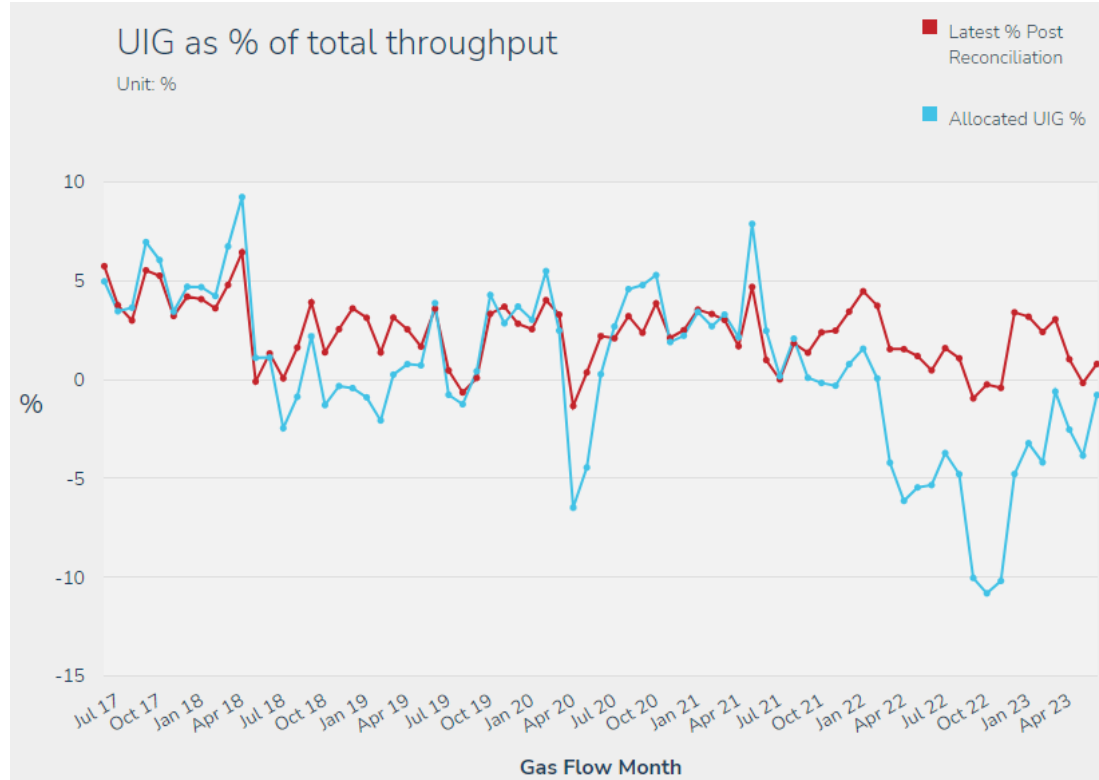
A positive MPE indicates an over forecast
A negative MPE indicates an under forecast

What is being done to reduce NDM Modelling Error?

- The DESC workplan includes time put aside each Autumn/Winter to review areas of the Demand Modelling process which can be improved for the following year or future years
- In recent years this has included:
 - Reviewing the 'Holiday Code' rules, used to determine how much the gas demand profiles are adjusted during holiday periods such as Christmas and Easter.
 - Reviewing the optimal EUC grouping used for modelling where there is insufficient sample data for LDZ level analysis
- This year (Winter 23/24) the workplan includes:
 - Review the use of Model Smoothing in the Demand Modelling
 - Review the Day of Week Demand behaviours, which currently group Monday to Thursday together for Modelling purposes
 - Investigate the impact of NDM Flexible Power Generation sites on modelling error

When is NDM Modelling Error removed from UIG?

- Following the issuing of the Amendment Invoice each month, an updated [UIG chart](#) is provided which shows the Allocated UIG, i.e. D+5 position versus the estimated “Latest % Post Reconciliation
- The difference between the two lines represents the difference caused by all parts of the NDM Modelling Error plus any other items included on the Amendment Invoice e.g. DM reconciliation
- Note: This is not definitive as we do not know how the actual consumption between a pair of meter readings has been used on a daily basis





Any questions?

Please visit [Raise a new support request – XOSERVE](#) to contact the Demand Estimation team